What is claimed is:

1. An electronic imaging apparatus comprising:

a first optical element having at least one reflective surface or having at least one flat surface and two transparent surfaces, chemical substance which enables to change light transmittance by chemical change according to electric quantity, a second optical element having a transparent surface or a reflective surface, and an optical system having an optical component which is arranged so as to sandwich the chemical substance by one of surfaces of the first optical element and one of surfaces of the second optical element.

2. An electronic imaging apparatus according to claim 1,

wherein the spectrum transmittance at whole range τ min$\leq$ τ 520 $\leq$ τ max satisfies the following condition when the whole transmittance of the first optical element, the chemical substance and the second optical element at the wavelength of 520nm is τ 520:

$$0.70 < \tau 440/\tau 520 < 1.20$$

$$0.80 < \tau 600/\tau 520 < 1.30$$

where τ x (x is a number) is the transmittance of the whole optical system containing the first optical element , the chemical substance and the second optical element at the wavelength of xnm.

That is, τ 440 is the transmittance of light at the wavelength of 440nm, and τ 600 is the transmittance of light at the wavelength of 600nm. τ min is the minimum transmittance when the chemical substance which enables to change transmittance is in the most opaque state and τ max is the maximum transmittance when the

chemical substance which enables to change transmittance can be changed is in the most transparent state.

3. An electronic imaging apparatus according to claim 1, comprising the optical system and an electronic imaging element wherein the following condition is satisfied:

$$F > a \quad (a \leq 3.5/\mu m)$$

where F is fully opened F value of the said optical system where a focal length is in the shortest state, and reference symbol a represents a pixel pitch (micrometer) of a picture element in the horizontal or the vertical direction of the electronic imaging element which converts an object image obtained through the optical system into an electric signal.

4. An electronic imaging apparatus according to claim 1, wherein a lens group at the utmost image side in the optical system is fixed when magnification is changed.

5. An electronic imaging apparatus according to claim 1, wherein a lens group at the utmost image side in the optical system is constituted, as a whole, with one lens component, and one of the optical elements having a refractive power constituting the lens component is the first optical element.

6. An electronic imaging apparatus according to claim 1, wherein a movable group at the utmost image side in the optical system has focusing function.

7. An electronic imaging apparatus according to claim 1,

comprising a prism and at least one reflective surface for bending an optical path.

8. An electronic imaging apparatus according to claim 7, wherein the first optical element is the prism,the chemical substance is arranged so as to be contacted with one of the flat surface of the prism, and the second optical element is arranged so that the flat surface of the second optical element is contacted with the chemical substance from an opposite side of the prism and, one of the optical surfaces of the second optical element is constituted as a reflecting surface for bending the optical path.

9. An electronic imaging apparatus according to claim 1, wherein the optical system is constituted with a zoom lens.

10. An electronic imaging apparatus according to claim 9, wherein the thickness from the surface top of the utmost object side to an imaging position of the zoom lens is less than 20mm in the state that the zoom lens is collapsed in the electronic imaging apparatus.

11. An electronic imaging apparatus according to claim 9, comprising a prism and at least one reflecting surface for bending an optical path at the object side than the lens of the utmost object side in all group which is movable when magnification is changed.

12. An electronic imaging apparatus according to claim 11,

wherein the first optical element is the prism, the chemical substance is arranged so as to be contacted with one of flat surfaces of the prism , the second optical elements is arranged so that the flat surfaces of the second optical element is contacted with the chemical substance from the opposite side of the prism, and either one of the optical surfaces of the second optical element is constituted as reflecting surface for bending the optical path.

13. An electronic imaging apparatus according to claim 12, wherein the prism is arranged, developed along the optical path from an object, at the utmost object side in the optical system.

14. An electronic imaging apparatus according to claim 13, wherein a surface of the prism at the utmost object side, developed along the optical path from the object, is concave.

15. An electronic imaging apparatus according to claim 6, wherein the optical system is an image forming optical system comprising at least a lens group having positive refracting power which moves monotonously toward the object side when the magnification is changed from the wide angle end to the telephoto end.

16. An electronic imaging apparatus according to claim 15, wherein the lens group is constituted with two groups having three lenses, where a positive lens and a cemented lens having a positive lens and a negative lens are arranged in order from the object side.

17. An electronic imaging apparatus according to claim 15, wherein the lens groups is arranged at the image side than an aperture stop side.

18. An electronic imaging apparatus according to claim 17, comprising the aperture stop whose position in the direction of the optical axis is fixed when magnification is changed and a lens group having negative refracting power which moves toward the object side than the aperture stop side when magnification is changed.

19. An electronic imaging apparatus according to claim 18, wherein the lens group having negative refractive power is constituted , in order from the object side, with a double concave lense and a positive lens.

20. An electronic imaging apparatus according to claim 8, wherein the refraction index of the prism is 1.68 or more than 1.68.

21. An electronic imaging apparatus according to claim 1, comprising means for controlling electrically an electric signal in relation with a picture image obtained from a state of the optical system and the imaging element, and transmittance of the medium respectively.

22. An electronic imaging apparatus comprising a first optical element having a flat surface and a surface with refracting power, or a flat surface and a reflecting surface, a chemical substance which enables to change light transmittance by chemical change

according to electric quantity, and a second optical element having a transparent surface or a reflecting surface and a flat surface, and an optical system having an optical component arranged so as to sandwich the chemical substance by the flat surface of the first optical element and the flat surface of the second optical element.

23. An electronic imaging apparatus according to claim 1, wherein the first optical element is either one of a lens having a surface with refracting power and a flat surface, a lens consisting of only surfaces with refracting power, a prism or a variable shape mirror.

24. An electronic imaging apparatus according to claim 1 or 22, wherein the second optical element is either one of a parallel plane board, a lens having a surface with refracting power and a flat surface or a lens consisting of only surfaces with refracting power.

25. An electronic imaging apparatus according to claim 1 or 22, using an optical system wherein the following condition is satisfied:

$$-0.05 < (R_A - R_C) / (R_A + R_C) < 0.05$$

where R_A is a curvature radius of the surface of the first optical element contacted with the chemical substance and R_C is a curvature radius of the surface of the second optical element contacted with the chemical substance.